GUIDANCE FOR THE DEVELOPMENT OF QUALITY ASSURANCE PROJECT PLANS FOR ENVIRONMENTAL MONITORING PROJECTS

Prepared for: _____

Prepared by: _____
Project Manager

Approved by: _____
NJDEP Program Manager

Approved by: _____
NJDEP Quality Assurance Officer

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION II

Quality Assurance Project Plan
for Environmental Monitoring Projects

This form presents the basic format for a Quality Assurance Project Plan (QAPP) for non-Superfund projects to be conducted for EPA Region 2. It is based on and is consistent with "EPA Guidance for Quality Assurance Project Plans, EPA QA/G-5, EPA/600/R-98-018". Individual sections, such as this title page, may be enlarged, or limited, as circumstances warrant. The QAPP must be prepared by the project manager or designee in cooperation, with representatives from all groups expected to be involved in the project or potentially using the information. The QAPP should be submitted for review at least 30 days prior to the scheduled project start date and must be approved before environmental data collection or usage activities begin. The QAPP must also be revised when proposed changes in the project will significantly impact either the technical or data quality objectives of the project, and all participants must be informed.

1. Title and Approval Page:

_____

Project Name

_____

Project Manager Signature/Organization/Approval Date

_____

Quality Assurance Officer Signature/Organization/Approval Date

If more than one agency or organization is involved, additional lines should be added for each organization. The managers of the field and laboratory groups should be included as signatories. An individual's signature indicates review and approval of this plan.

2. Table of Contents:

A table of contents is needed if the document being submitted is longer than approximately ten pages. In addition, document control notation (such as found in the upper right hand comer of this standard operating procedure) is recommended for documents of considerable length.

3. Distribution List:

A distribution list is recommended to ensure that all individuals involved with the implementation of the project. will receive a copy of the QAPP and any future revisions, if necessary.

4. Project Description/Background:

This section should be written such that a technical person, unfamiliar with the project, will understand what is intended. State, the specific problem in to be addressed or the decision to be made. Include background information indicating the need for this study. Indicate the intended use of the data by describing the decisions to be made, along with action levels or standards, if any, that will be used. This represents the justification for all that follows in this document. Identify the expected users of the data. State how willing you are to make a mistake, to be wrong. Fully detail how the success of the project will be determined.

5. Project/Task Technical Design:

Describe and justify the sampling design and strategy. State what you are testing for, and how often. Identify which measurements are essential to the project's objectives and which are secondary. Identify where the site is located and give the rationale for site location. State the number of anticipated sampling points and how they will be selected. If there will be a site evaluation or trial run before the project is started, state that. Attach a map showing the site(s) and each sampling point. Discuss how locational information will be obtained, such as the use of Geographical Positioning System (GPS) instrumentation. Identify the potential sources of spatial and temporal variability and how the monitoring design will account for them. (Potential variability might be seasonal, diurnal, upstream vs. downstream, tidal, soil profile changes, and process variation within the source.) State what quality control (QQ activities will occur during the project, e.g., field blanks, replicates, and QC samples.

6. Project Organization and Task Responsibilities

List key individuals in charge of every major activity, including those for whom the data are intended, along with their telephone numbers. Attach an organizational chart identifying these people, showing their relationships and lines of communications as well as their responsibilities. If names are not known because contract or grant arrangements

are not finalized, they must be supplied prior to the start of work. Note who is responsible for approving and accepting final product/deliverables.

7. Special. Training Requirements and Responsibility:

Identify any special training and certification requirements needed by any project personnel for field or laboratory activities and how this information will be provided, documented and assured.

8. Project Schedule:

Delineate the project schedule from initiation to final report submission, listing all intervening major events or actions. This can be prepared in tabular form.

9. Field Sampling Table or Related Information:

A major purpose for this section is to ensure that the sampler will collect what the laboratory needs, and according to method and/or regional requirements. Identify and include all field sampling QC samples in the total number of samples. State any special handling requirements. This information can be shown in tabular form:

Sample Matrix	Analyte/ Parameter	Total # Samples	Sample Volume	Type Sample Container	Sample Preservation	Holding Time

10. Field Sampling Requirements:

All sampling methods should be fully described, referenced, or attached to this document in the form of approved Standard Operating Procedures (SOPs). Specify all selected options and describe deviations from standard protocol. Unless the complete method descriptions, with all specified options, are readily available, attach them to the QAPP. List all sampling equipment needed. Describe techniques or guidelines to be followed in selecting sampling points and equipment, identifying what to do when problems arise. Identify the nature of the samples, such as grab or composite, and how you define grab or composite. If flow is to be determined, state how. If samples are to be homogenized or split, state how. Describe field equipment cleaning procedures used to prevent cross contamination.

11. Sample Handling and Custody Requirements:

Describe the logistics of sample handling, and any chain-of-custody requirements, in the field, the laboratory, and during transportation. Attach any forms to be used, such as sample identification labels and custody forms. Identify where sample containers will be obtained and any special cleaning procedures. State requirements for sample archiving and disposal.

12. Analytical Method Requirements:

The analytical methods to be used, including extraction methodology and decontamination procedures, must be referenced or included as SOPs. Fully specify all selected options and describe any deviations from published and/or required methodology, along with the procedures for and/or results of validation of the modified method. Unless the complete method descriptions, with all specified options, are readily available, attach them to the QAPP. Identify all required QC checks, such as reagent blanks,, duplicates, and matrix spikes, their required frequency, and actions to be taken if control. limits are exceeded.

When field instruments are to be used to analyze samples, include this information here. When field instruments are to be used to collect and analyze samples (such as real-time continuous analyzers), include that- information in a separate table.

The methods and instruments to be used must be capable of measuring each analyte at the desired detection level, and the methods approved for these sample matrices. Different methods have different levels of accuracy and certain methodologies may be required by program regulations. Much of this information can be shown in tabular form:,

Analyte/ Parameter	Sample Matrix	Analytical Method 'Reference	Method Detection Limit*	Estimated Accuracy*	Estimated Precision	Required Action Levels or Standards

as validated in the laboratory used for the project.

Precision for laboratory and field samples is the relative percent difference between two duplicate determinations:

$$\frac{(x_1 - x_2)}{(x_1 + x_2)/2} \times 100$$

where x_1 and X_2 represent samples1 and 2

Analytical accuracy is calculated as the percent recovery of the matrix and/or surrogate spike in laboratory operations:

$$\frac{\text{Concentration detected in spiked sample} - \text{Concentration detected in un-spiked sample}}{} \times 100$$

amount spiked

13. Secondary Data (Non-direct Measurement) Projects:

For those projects in which environmental data will be obtained from computer data bases or from literature files, the project officer must define the types of data needed for the project, as well as the quality acceptance criteria for this information. This information may have been collected by researchers for purposes other than that intended in the current study. Fully discuss limitations on the use of the data (e.g. different site locations, dates original studies were conducted, different sampling and analytical methods used, availability of the laboratory/researcher QA/QC records). Determine how the data will be qualified and how deficiencies will be resolved. Publication in peer review literature is not equivalent to meeting the QA/QC requirements for an approved Quality Assurance Project Plan.

14. Other Data Quality Indicators:

Any QAPP must describe the Data Quality Objectives of the project, expressing what the results of the project will be used for and the data quality necessary to support that use. Data Quality Objectives should be developed jointly, and in a systematic manner, by technical and project managers. The process should combine management's need for confidence in their decision-making with the practical difficulties and expense of collecting "better" data. The monitoring design and specific procedures, including both field sampling and analytical operations, can greatly affect the usability of the data. In order to estimate and report these effects, the Plan must specify quantitative and qualitative data quality indicators such as precision, bias/accuracy, representativeness, completeness, comparability, and sensitivity or method detection limits. The analytical (quantitative) aspects of precision, bias/accuracy, and sensitivity (i.e., detection limit) have been covered in previous sections. In this section, the qualitative data quality indicators representativeness, comparability, and completeness need to be discussed:

a. Representativeness:

Representativeness is the extent to which measurements represent the true system. State the goals for achieving data representativeness and how they will be obtained. Describe how the collected data will accurately represent the population or environmental parameter being measured. Discuss how the sampling design will account for spatial, temporal, and parameter variations. Sample questions to be answered are: Is one sample a month representative of normal conditions? Will the samples be collected at a spot that is not unduly affected by stratification? Will this study require sampling at the top, middle, and bottom of the water column or sediment core? Are composite samples needed?

b. Comparability

Comparability is defined as the extent to which data from one study can be compared directly to similar studies. State the goals for achieving data comparability and how they will be attained. Describe how confident you must be in comparing the results with those of other studies, e.g., are the data expressed in standard units, are the same species or compounds being tested, are the same methods being used, etc..

c. **Completeness:** Completeness is the fraction of planned data that must be collected in order to fulfill the statistical criteria for the intended use of the data. State the level of completeness required. For example, of the 20 samples planned to be collected, 80% or 16 are required for a valid determination of compliance. Finally, indicate whether sufficient resources will be allocated to ensure completion of this project..

15. Peer Review:

Peer Review, as defined by the January 19, 1993, EPA Policy and current Region II guidance, is the consultation of and/or review of the final product by "experts," either inside or outside EPA, but outside the specific project team. Peer involvement is less rigorous assistance provided by others. Please indicate whether this project will include Peer Review, and, if so, what type and at what level.

a.	Peer Review	YesNo
b.	Peer Involvement	Yes No
C.	If so, describe the type and level of Peer Review/Involvement.	

16. Instrument, Equipment, and Supplies Testing and Maintenance Requirements:

For all field, laboratory, and data management equipment and supplies, describe inspection and acceptance criteria before use, as well as the need for, and frequency of, calibration checks and maintenance.

17. Assessments/Oversight:

Assessments include various reviews and audits conducted by independent individuals and/or organizations, designed to ensure that the QAPP will be followed throughout the project, to identify shortcomings or deviations, and to initiate corrective actions.

List the inspections or reviews (including peer reviews, readiness reviews, performance evaluations, and technical system audits and data quality audits) of project management and field, laboratory, and data activities that will occur throughout the project. Identify

who will perform these assessments at each step of the project, their relationship to the project organization, and the scope of their authority (e.g. issuing stop work orders), and the frequency of the proposed assessments. Discuss how and to whom the results of assessment will be reported. Identify how response (or corrective) actions will be addressed and documented and who has the authority to order such actions.

18. Data Review, Validation and Usability:

State criteria used to review and accept, reject or qualify data, describing what will be done and by whom. Specify what modeling or statistical evaluations will be performed and how they will be validated. Include sample copies of all data log sheets, chromatograms, etc., and examples of any calculations that will be performed on the raw data to achieve the final result. Describe how errors, if detected, will be corrected. Describe how blanks, duplicates, spikes, etc., will- be treated in all calculations. Finally, discuss how results obtained from the project will be reconciled with the requirements defined by the user and how any limitations on data will be reported to the data users.

19. Documentation and Records:

Specify the frequency of all reports and the names of the originators and to whom they will be issued. Itemize what information and records must be included in the final report and all intermediate reports. Identify where the raw data and final report will be located, in what form (include paper, electronic, and database locations, as appropriate), how data can be retrieved at a later date, and the length of time it must be retained.